

"It is making us a good saving in  
our coal bills every day." —Byron  
*Weston Co., Dalton, Mass.*

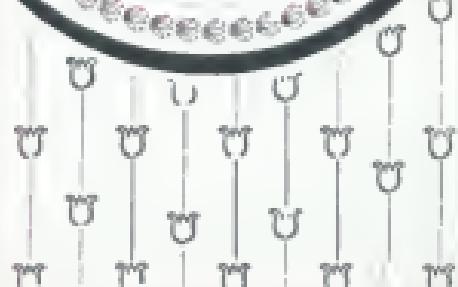
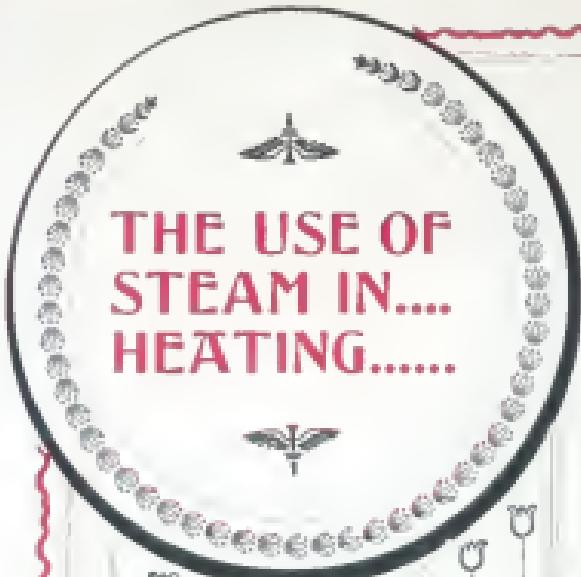
The system is founded on natural principles.—*Callender, McAuslan & Troup Co., Providence, R. I.*

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We would recommend the Paul System to any one desiring a perfect working heating system.

—*E. S. Fife, 304 First National Bank Building, Chicago.*



"Over two years' use. We have never regretted putting it in."—*Northampton Cutlery Co., Northampton, Mass.*

FOR many years steam has been used for heating purposes, and it has been supposed that pressure varying from 100 pounds downward was absolutely necessary to achieve the desired result. But the constant tendency of recent practice has been towards a reduction of pressure. So far, indeed, have the results justified such action that it is now generally conceded that the highest results in efficiency, economy, and hygiene are to be attained by the use of steam at or below atmospheric pressure.

"From the results of my investigation on the subject, I am convinced that steam circulated at atmospheric pressure, will give you an economy of from 10 to 20 or 25 percent over steam circulated at about 5 lbs. pressure above the atmosphere."—*Prof. J. H. Kenealy, Washington University, St. Louis, Mo.*

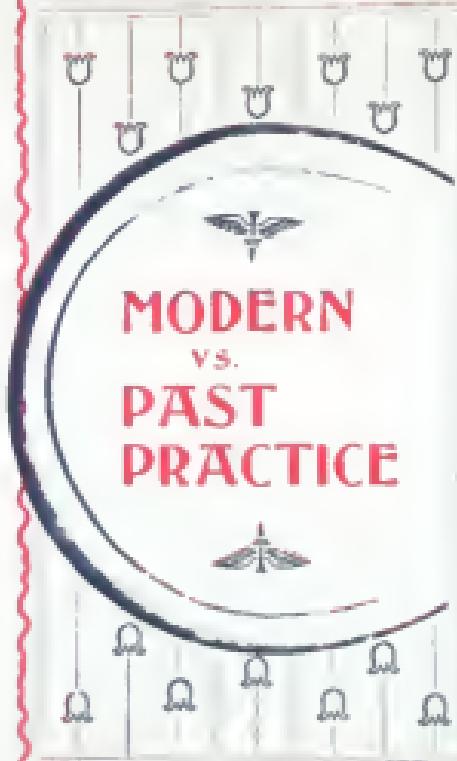


## MODERN.... BUILDINGS

"We have never had any complaints from the tenants in the matter of heat in their offices." —*Hartford Bldg., New York.*

THE construction and proposed plan of operation of nearly all large modern buildings, such as hotels, office buildings, hospitals, theatres, etc., contemplate the installation of a combined power and steam heating plant. The present demand for elevator and electric lighting service, and for many other purposes for which steam is used for power in buildings which are to be heated, affords the opportunity a very large amount of skill and ingenuity in planning a combination system of power and heating, to the end that the steam produced upon the premises may be utilized with the utmost economy and efficiency.

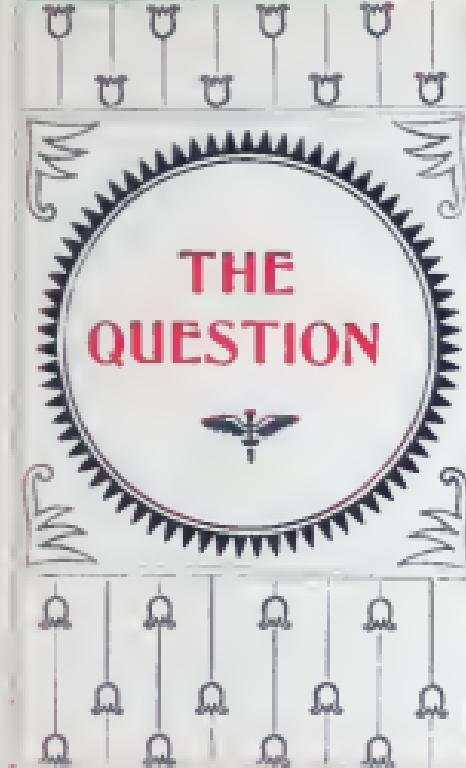
"The system in the Portland Block paid for itself in about two years." —*Geo W. Cobb, Real Estate, Chicago.*



"The Paul System is all right."—*The Youth's Companion*, Boston, Mass.

THE question of net profit to the manufacturer is always important. In the close competition of modern industry, economies effected by the adoption of modern machinery and processes bear closely upon the question of net profit. The difference between profit and loss may, and in many cases actually does, depend upon the employment of modern methods. The continuation of antiquated practices entails great loss of net profit. Have you adopted modern methods in your steam plant? If not, will you investigate?

"We consider the investment a good one."—*Rogers & Brother*, Waterbury, Ct.



"The System has proved entirely satisfactory, enabling us to heat the building more thoroughly and much easier than ever before."

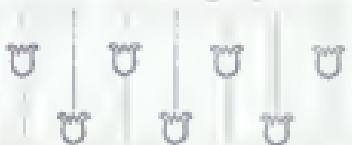
—*Shepard, Norwell & Co., Boston, Mass.*

THE question, then, is this: "By what means or method shall the most excellent qualities of steam as a heating agent be realized, and the wasteful practice of forcing it to points of use by pressure be supplanted, to the end that such steam shall be conveyed or caused to flow through systems of piping to coils and radiators, for the purpose of there releasing its mild and healthfull heat, and to accomplish this highly desirable result with the utmost economy and efficiency?"

"We find it is very reliable."

—*McKinney Mfg. Co., Allegheny, Pa.*

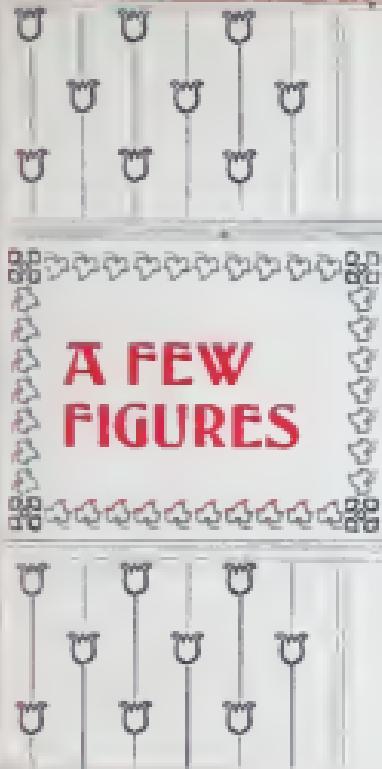
## BACK PRESSURE



"We can heat our houses quicker, and use our exhaust steam without back pressure. —*Macular, Parker & C., Boston.*

NASMUCH as exhaust steam has no inherent tendency to circulate to points at which it is desired to release its heat units, the attempt has been made to force it into circulation by pressure, that is, by back pressure at the engine. It will require but a moment's consideration to convince any intelligent investigator that under such circumstances a considerable proportion of the gain secured by utilizing the exhaust steam is thus lost, because of the additional coal consumption required to maintain the required horse power of the engine against such back pressure.

The Paul System enables us to have a better circulation of steam than we could otherwise have.' —*Wisconsin School for the Deaf, Delavan, Wis.*



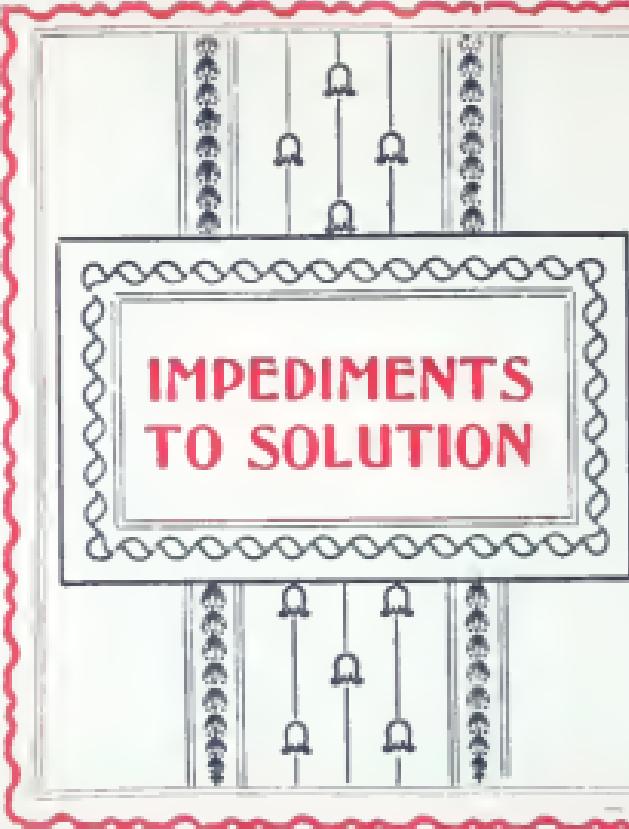
## A FEW FIGURES

"Our exhaust steam heats the house without one dollar's cost."

—William G. Leland, Grand Hotel, New York.

**A**S there yet remains a large number of plants wherein no attempt has been made to utilize the exhaust of engines, pumps, etc., for heating purposes, it may be pertinent here to assert that in many cases the entire excess of winter coal consumption over that of the summer season represents pure and unadulterated waste. The loss of one cent's worth of exhaust steam per minute amounts to the astonishing total of \$1,080 during one heating season, or say 5% on \$21,600 of invested capital.

"There is little difference between the winter and summer coal bills." —Thayer & Jackson Stationery Co., Chicago.



## IMPEDIMENTS TO SOLUTION

"We could not possibly get along without it and heat two factories with one boiler, which is what we are now doing."

—C. S. Pierce, Brockton, Mass.

In seeking a solution of the problem here presented, many expedients have been resorted to, and many methods have been tried. A careful consideration of this question will show that the chief obstacle or impediment to the complete circulation of steam is to be found in the fact that at starting the whole system is full of AIR, and that a greater or less amount of air is always present therein. It is a well-known fact that the water usually used for boiler feed purposes contains air, and further that this air is one of the best non-conductors

"It is very satisfactory."

—Reliance Building, Chicago.

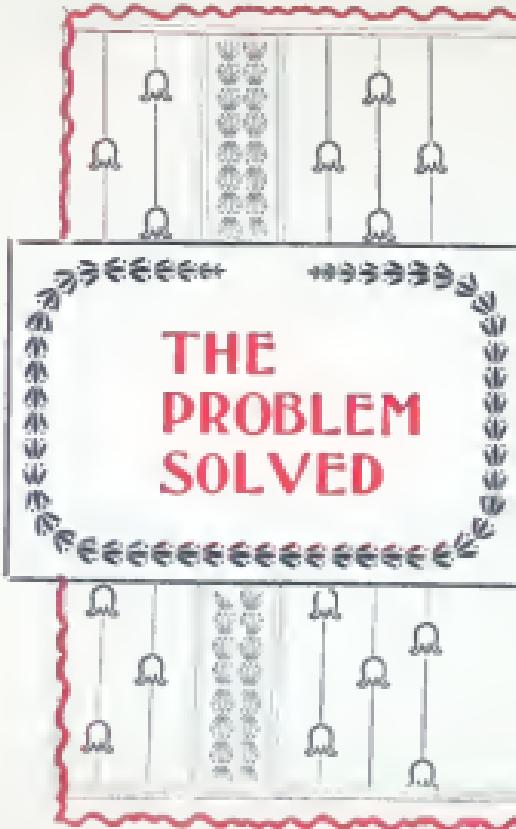
"It gives the most gratifying results." — *Theodore W. Foster, Providence, R. I.*

## IMPEDIMENTS TO SOLUTION

*Continued*

of heat. When steam passes into a radiator or coil the process of condensation immediately begins, but the steam alone is condensed, leaving the air to obstruct the incoming steam from distributing its heat uniformly over the heating surface. It is a matter of common observation that certain parts of wall coils and certain sections of radiators while in operation, are materially hotter than others. The cause of this apparent phenomenon is to be found in the fact that the entering steam has forced the air into certain parts of the coil or radiator, and thus a uniform distribution of the heat of the steam is impossible, even under heavy pressure. It must be apparent that under such circumstances a considerable area of all such coils and radiators is practically worthless as a heat distributor.

"The System gives us excellent satisfaction." — *New England Bldg., Cleveland, O.*



"We congratulate you upon having solved a problem that heretofore has given a vast amount of trouble and expense."

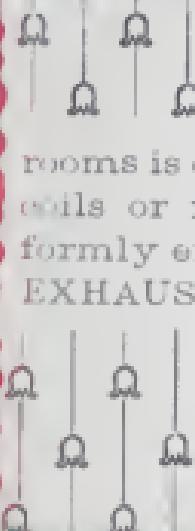
—*Powell & Bro., Philadelphia, Pa.*

THE desired result was at last achieved by the automatic and independent removal of air from the system without pressure, this being accomplished before the steam is admitted; the apparatus being kept continually free of air, and the circulation maintained in each and every radiator by means of the natural decrease in volume of the steam in the apparatus due the condensation; this in turn being governed by the temperature of the air in the space to be warmed,—this desired end being attained by the use of the PAUL SYSTEM.

"We have found it the most economical device yet installed."

—*Asst. Milwaukee Hospital for the Insane.*

## HYGIENE AND EFFICIENCY



"We are well satisfied with the Paul System."

—Hartwell & Richards Co., Providence, R. I.

THE heating apparatus has no openings into the apartments to be warmed, and consequently the air in the rooms is not vitiated by foul gases escaping from the air valves, and there are no drippings to stain carpets or ceilings. The temperature of the steam is constant, no pressure being required to circulate it, and the disagreeable dry, "burnt" air in rooms is entirely avoided. There are no volumes of air locked in portions of coils or radiators, but every square inch of heating surface is rendered uniformly efficient while steam is being used in the heat distributer. Wherever EXHAUST STEAM is available, it is utilized under the System WITHOUT CAUSING BACK PRESSURE at the engines or pumps, and this great WASTE is made as valuable as the same quantity of live steam direct from the boiler.

"Has been working very satisfactorily."—Illinois Trust and Savings Bank, Chicago.

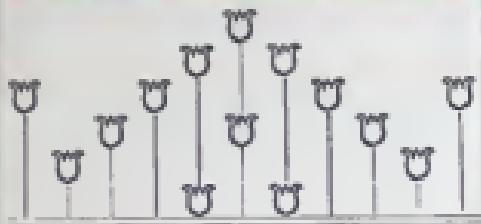


## CONSTRUCTION AND OPERATION OF THE SYSTEM

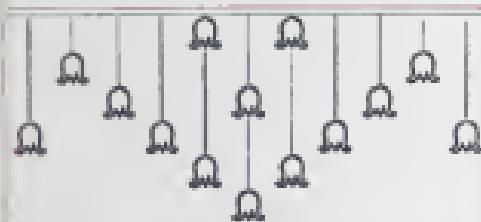
"It has shown a marked saving."—*Turner's Falls Paper Co.,  
Turner's Falls, Mass.*

A N automatic air valve is placed on each radiator, coil, or indirect stack, and connected with an air riser. The air risers are run beside the steam risers and brought together at some convenient point in the boiler or engine room, and there connected to the exhausting apparatus of the PAUL SYSTEM. Before the steam is turned on the plant the Exhausting Apparatus is put in operation, and the air contained in all the heat distributors is quickly removed, and each radiator, coil or stack in the building is maintained in the best possible condition to receive steam.

"We feel safe in earnestly recommending it."—*Jennie & Mundie,  
Architects, Chicago.*



## CONSTRUCTION AND OPERATION *(Continued)*



"It has effected a large saving in fuel."

—Albany Card and Paper Mfg. Co., Albany, N. Y.

UPON opening the supply valve the steam flows naturally and *without pressure* into the radiators, coils, etc., and its heat closes the automatic air valve. In the process of condensation a great deal of heat is given off by radiators in the form of "radiation" and the volume of steam is being constantly decreased in the ratio of 1700 to 1. Such decrease creates a constant flow toward the heat distributor which is counteracted by an additional steam supply. Means are also provided for the subsequent removal of air as rapidly as it collects, and therefore all the heat distributors in the heating plant are maintained at all times in a uniformly efficient condition to perform their office.

"The exhaust steam circulates without back pressure, and condensation returned at a higher degree of temperature."—Rogers & Hamilton Co., Waterbury, Ct.



"It has worked to our entire satisfaction."—*Robert MacKinnon, Little Falls, N. Y.*

THE Paul System has been before the public for about seven years, and stands to-day the most economical method of heating by steam. It is installed upon over four million square feet of heating surface in office and public buildings, theatres, hotels, private residences, mills, and factories throughout the United States and Canada. The System is applicable to all kinds and forms of apparatus for heating or drying by steam, and has effected a great advance in economy and efficiency in the operation of Drying Cans, Slashers, Paper Drying Cylinders, etc. The System can be applied to existing plants as well as installed in connection with new work. We respectfully invite your examination of the following pages showing some tests made on plants operating under the System.

"Avoided the necessity of putting in practically a new steam plant."—*Mead & Coe, Chicago.*

"The System is giving us excellent satisfaction"—*American Tool and Machine Co., Boston, Mass.*



## Advantages in the Use of the Paul System



- 1st. A positive and uniform circulation of steam without pressure above that of the atmosphere.
- 2d. Utilizing the heat of steam at low temperatures, thereby gaining great economy.
- 3d. Warming without impairing the quality of the air in the rooms.
- 4th. The independent and automatic removal of the air and water of condensation from the heating apparatus.
- 5th. A sealed system; no leakage, no smell or dripping from air valves.
- 6th. All heating surface is held in the best condition to operate promptly when desired, and all parts of the surface are rendered uniformly efficient when steam is turned on.
- 7th. *Exhaust steam utilized without back pressure at engine or pump.*
- 8th. The water of condensation returned quickly and economically at high heat temperatures.
- 9th. Less steam used, less coal burned to heat a given space.

"We know the System to be economical!"—*Carson, Pirie, Scott & Co., Chicago.*

OHIO STATE UNIVERSITY.

COLUMBUS, Ohio, May 26, 1897.

PAUL STEAM SYSTEM CO.,

BOSTON, MASS.

Gentlemen.—Inclosed is the report of test of Paul Heating System as against the ordinary heating, made by Prof. E. A. Hitchcock, M. E.

Hoping this will be satisfactory, and wishing you success, I am,

Yours truly,

(Signed) WM C. McCACKEN,

*Chief Engineer.*

N. B.—The tests were made on live steam only, no exhaust being used. The Paul System is in use on the entire heating plant, containing about 41,000 square feet of radiation in several buildings. The test was made on one of the buildings.

## Test of Paul Heating System at Ohio University.

	<b>With System.</b>	<b>Without System.</b>
Date of tests . . . . .	March 25, 1897. 7.30 P. M. to 7.30 A. M.	March 27, 1897. 6 P. M. to 6 A. M.
Duration of tests . . . . .	12 hrs.	12 hrs.
Barometer . . . . .	29.41	29.41
Gauge Pressure on main before passing pressure regulator . . . . .	21.	26.4
Quality of steam . . . . .	98.83	99.23
Gauge pressure on main after passing pressure regulator . . . . .	0.	6.2
Pressure on air line vacuum . . . . .	6.8	
Average temperatures, degrees Fahr., external . . . . .	31.375	33.04
Average internal temperatures, 6 rooms, 11 thermometers . . . . .	71.55	71.75
Total weight of return water . . . . .	8,160	9,578
Temperature of return water . . . . .	195.6	207.
Steam used by exhaustor per hour . . . . .	36.	
B. T. U. per hour for heating . . . . .	607,340	783,490
Per cent. saving in B. T. U. . . . .	14.4%	
Per cent. saving by weight of steam . . . . .	14.8%	

"We have saved a great deal of engineer's and janitor's time."—George R. Read, Real Estate, New York City.



As an illustration of the results accomplished by the installation of the PAUL SYSTEM in connection with Blower Heating Apparatus, the following facts taken from an actual case may be cited:—

Height of Buildings . . . . .	3 Stories.
Area . . . . .	4 Acres.

Heating performed by three stacks containing In all 24,150 lineal feet of inch and one quarter pipe, or say 10,500 square feet of heating surface.

Engine . . . . .	500 H. P.
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**Data secured before the introduction of the Paul System.**

Back pressure on engine to force exhaust steam into heater . . . . .	4 lbs
Temperature of air from heater . . . . .	130° (18° outside).

**Data secured after the introduction of the Paul System.**

Back pressure on engine . . . . .	0 lbs.
Temperature of air from heater . . . . .	148° (18° outside).

"It has saved us a ton of coal every day since we put it in."—Pepperell Card and Paper Co., East Pepperell, Mass.

# Test of Heating on Feb. 24 and 25, Milwaukee City Hall.

Milwaukee, March 4, 1897.

Mr. S. J. Brockman,

Com'r of Public Works, City.

Dear Sir.—Appended hereto is report of test of heating system operated with pressure and partial vacuum, or with Paul System disconnected or connected.

Result, you will observe, is a saving of 17.24 per cent. of coal consumption on February 25, over that of February 24, with an average temperature of 6.67 degrees lower, and an increase of 2.95 H. P. of work done by electric light and elevator plant.

Respectfully submitted,

ROB'T ANDERSON,  
Supt. of City Hall.

	Number of hours run.	Outside Temperature In degrees Fahrenheit.	Pressure in pounds on Heating System.	Work done by Elec- tric Light Plant in H. P. per Hour.	Work done by Eleva- tor Plant in H. P. per hour.	Coal consumed in pounds.
<b>February 24, Paul System Disconnected.</b>						
Maximum		35.5	2.75			
Minimum		5	2			
Totals and Averages	24	18.81	2.25	30.5	19.5	15,600
<b>February 25, Paul System Connected.</b>						
Maximum		18	.25			
Minimum		6	.25			
Totals and Averages	24	12.14		33.32	19.73	12,900

NOTE—One day's saving in Coal by use of the Paul System, 2,700 pounds

"The System is giving perfect satisfaction, both in manner of operation and economy of same."

—Morgan Envelope Co., Springfield, Mass.

# The Paul System



FOR OFFICE AND PUBLIC BUILDINGS, MILLS,  
FACTORIES, RESIDENCES, ETC.

BOSTON MASS.,  
35 Pearl St.

NEW YORK CITY.  
Park Row Building.

CHICAGO, ILL.  
Fisher Building.

CLEVELAND, O.  
New England Bldg.

DRYING CYLINDERS FOR DRYING PAPER,  
DRYING CANS, SLASHERS, ETC., FOR DRY-  
ING CLOTH OR YARN; LOFTS, DRY KILNS,  
BLOWER HEATERS, ETC., ETC.

Paul System Offices: PHILADELPHIA,  
MUTUAL LIFE BUILDING.

KANSAS CITY. ST. LOUIS, MO..

ST. PAUL.  
Endicott Arcade Bldg.

"I consider it a good investment." —P. D. Gray, President of the First National Bank of Chicago.

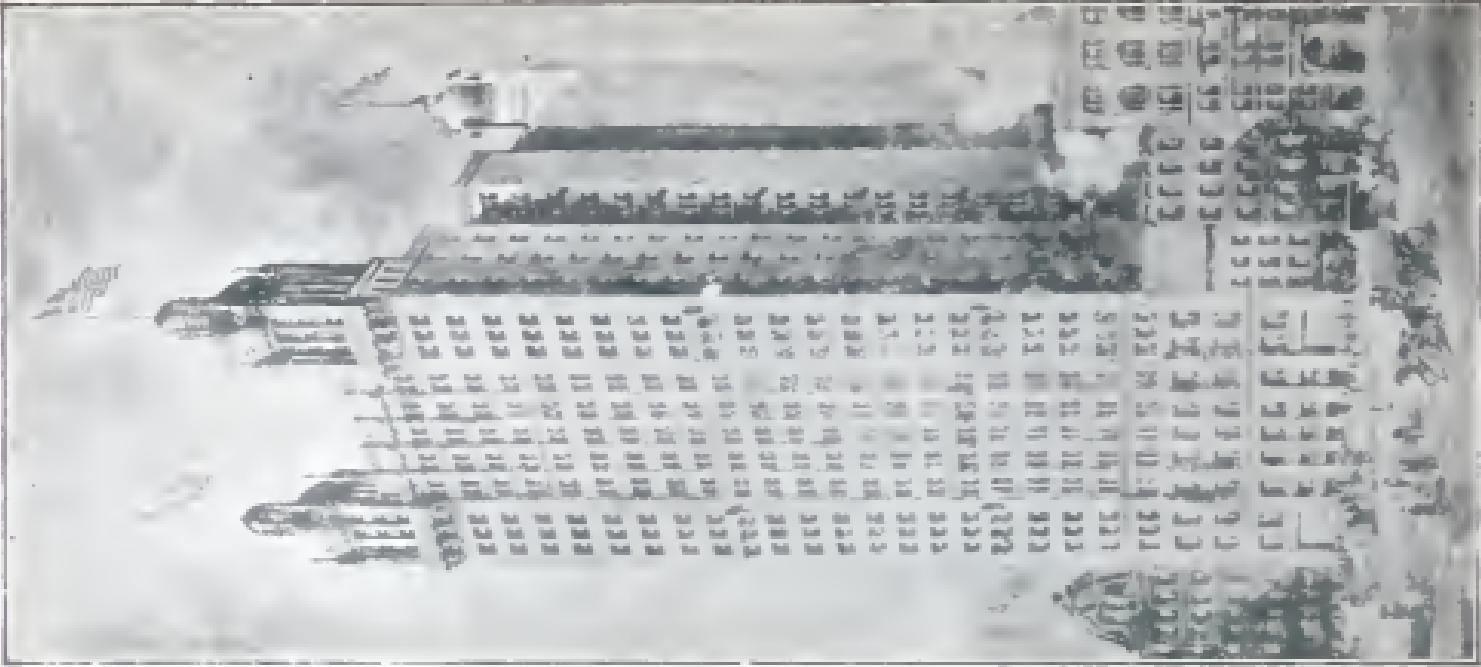
SHEPLEY, RUTAN & COOLIDGE,  
Architects.

JOHN LAWRENCE MAURAN, St. Louis Representative.

The Paul System is installed in a number of buildings constructed under our charge. No claim has been unfulfilled, no word of complaint has reached us from engineers in charge of the plants so equipped.

JOHN LAWRENCE MAURAN.

# Paul System Installed.



PARK ROW BUILDING, NEW YORK CITY.

E. RUTZLER,  
New York, Heating Contractor,

J. ROBERTSON,  
New York, Architect